SAE International™

"The premier society dedicated to advancing mobility engineering worldwide"

SAE Foundation
presents

A WORLD IN MOTION®

The **Design** Experience

SAE®

SAE FOUNDATION
for Science and Technology Education

Fun and challenge. These are the two main ingredients in our innovative, hands-on physical science curriculum, *A World In Motion*.

A World In Motion makes the challenges of math and science exciting by bringing authentic engineering design experiences into the classroom.

Designed by the SAE International, the *A World In Motion* curriculum joins together teachers, students and volunteer practicing engineers and scientists in an exploration of physical science. The *A World In Motion* program is comprised of a series of four curricula referred to as Challenges for students in Grades 4-10.

A World In Motion brings math and science principles to life through highly interactive learning experiences that incorporate the laws of physics, as they relate to motion, flight and electronics. Each of the four *A World In Motion* Challenges are designed around current math, science and technology standards.

Challenge 1 – Grades 4, 5 and 6

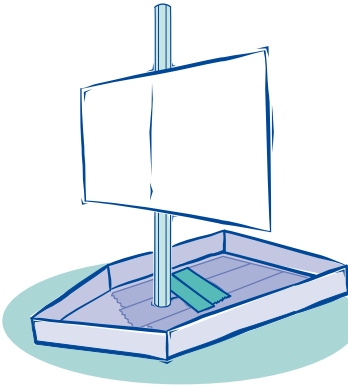
Skimmer, JetToy

The discovery of physical science principles is the emphasis of *A World In Motion*: Challenge 1. Students will love the fun, exciting and relevant hands-on science and math experiences involved with Challenge 1 activities.

Teachers are provided with comprehensive *A World In Motion* kits that include detailed lesson plans and instructional materials. Each Challenge 1 kit includes all the classroom materials for 27-36 students to build a skimmer (boat) or jettoy.

The Challenge 1 curriculum is integrated to include science, math, technology education, social studies and language arts. Each of the *A World In Motion* challenges are highly interactive and perfect team-building exercises.

Teachers love the sense of accomplishment that students feel when they see their creations take form and skim across a table, or race down a ramp. More than 1.5 million children across North America have shared in the excitement and knowledge of *A World In Motion*: Challenge 1.

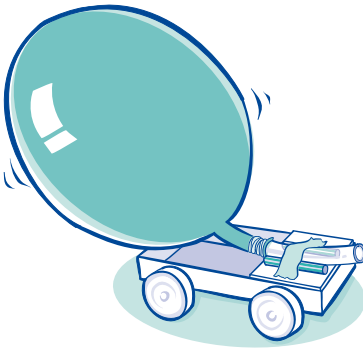


Skimmer Activity (Grade 4):

The goal of this challenge is to design a set of skimmers (boats) that reliably meet specific performance criteria. Friction, forces and the effect of surface area are some of the physical phenomena students encounter in this challenge.

JetToy Activity (Grade 5):

This activity challenges students to design an appealing toy that performs in a specific way – travels far, carries weight or goes fast. Students experiment with different chassis designs and nozzle sizes to determine their effect on the toy's performance.



Coming Soon (Grade 6 Activity):

"I use Challenge1: JetToys, with 4th and 5th graders. I love the program because I believe that hands-on involvement in elementary science is essential. Through AWIM, students understand scientific principles of motion and design, as well as how to measure in metric units, how to work creatively and productively in a small design team, and how to present their final product. So much learning takes place across the curriculum within one unit! Students love this program and their "fleet" of original JetToys is awesome!"

Sue Casker
Connoquenessing Elementary

Challenge 2 – Grade 7
Motorized Toy

Developed for middle school students, *A World In Motion*: Challenge 2 was made possible through a $1.8 million challenge grant from the National Science Foundation.

Implemented over the course of eight weeks, this challenge requires students to work together in engineering design teams. Each design team works together to research, market and build a motorized toy vehicle.

Challenge 2 integrates learning activities in science, math, technology education, social studies and language arts. Like Challenge 1, this program also provides opportunities for engineers, scientists and other professionals to volunteer in the classroom.

Each Challenge 2 kit comes with materials to build nine motorized toy vehicles. Each kit contains enough material to teach 27-36 students. Three to four students work together on a design team. Challenge 2 materials are non-consumable and may be reused year after year. A teacher's manual, posters, and a "gears and wheels" video also accompany the instructional materials

Teachers claim that students are both engaged and enthusiastic while working with Challenge 2. This activity gives students the opportunity to incorporate cognitive learning with creativity and imagination.

"AWIM is a great program that teaches young people about the world of engineering and technology. A must program for every elementary program!"

Dr. Daniel Engstrom
Assistant Professor, California University of Pennsylvania

Challenge 3 – Grade 8
Glider

Students' fascination with flight makes *A World In Motion*: Challenge 3 a favorite classroom activity for upper middle/junior high students and stimulates learning.

Challenge 3 demystifies the relationship between force and motion or the effects of weight and lift on a glider. Students will grasp the relationships between data analysis and variable manipulations, and the importance of understanding consumer demands.

This challenge culminates in a book-signing event where each design team presents its prototype, and the class presents its manuscripts to Mobility Press "representatives" and members of the local community.

Like Challenges 1 and 2, Challenge 3 content meets criteria set forth in the national science, mathematics, and technology standards. Problem-solving skills and career orientation emphasized in the school-to-work initiative receive special attention.

Teachers receive enough materials to teach a classroom of 27-36 students. Design teams are composed of three to four students working together to design a glider and write an instruction manual to accompany the "flying toy." Not only do teachers receive glider materials they also receive a teacher's manual, posters and a video detailing teaching tips.

This challenge was also made possible through a grant from the National Science Foundation.

The San Diego Aerospace Museum won't teach their 5th-grade "Aviation" class without them. Local school students spend two weeks of their school year at the museum, where the SAE "Challenge 3" gliders are a central part of the Aerospace Museum's emphasis on the scientific process. The gliders are certainly the students' favorite part.

Every student builds a glider, using it to demonstrate the scientific process: Observation, Question, Hypotheses, Experiment, and Conclusion.

The gliders' simplicity, flexibility, and markings make adjustments and measurements easy. "The SAE gliders are a perfect match for our curriculum—there is no substitute" according to museum educators.

Ross E. Davis
Education Resources, Volunteer Coordinator
San Diego Aerospace Museum

Challenge 4 – Elementary, Middle & High Schools

NEW!

Electricity and Electronics

The newest curricula in the *A World In Motion* series, Challenge 4 includes 35 experiments in subject areas like static electricity, batteries, circuits, magnets, and transistors.

Challenge 4 is a hands-on curriculum that helps students in Elementary, Middle and High School learn about the fascinating principles of electricity and electronics.

Examples of activities in the Challenge 4:

Elementary School:
- Versorium
- Electroscopes

Middle School:
- Solenoid
- Electric Motor

High School:
- 7 Segment Light Detector
- Audio Amplifier

"Our SECME teachers always delight in 'A World In Motion' training. Not only does the standards-based content adapt readily to different grade levels, but each AWIM 'Challenge' is beautifully designed to excite curiosity and engage students in a real learning adventure that inspires further exploration and inquiry."

Dr. Yvonne B. Freeman
Executive Director, SECME

Corporate Partnerships

A World In Motion kits range in price from $65 to $500 per kit, depending on which challenge the school chooses to use. The SAE Foundation policy provides one free kit to schools that form a partnership with area corporations, which then provide volunteers to assist in the classroom. As these industry volunteers work with students, they provide technical assistance and often serve as role models for young people who may never have considered a career in science and engineering before.

Across North America and beyond, many corporations have committed their resources to support *A World In Motion* programs. Numerous corporations within the mobility industry provide hundreds of employees who volunteer their time and talent to students and teachers in countless classrooms. In addition to providing their human resources, they also provide financial resources that have helped SAE to keep *A World In Motion* programs current and to distribute materials to more and more classrooms.

Supporting *A World In Motion*

Funding for the development of the AWIM Challenges was provided by individual and corporate contributions and the National Science Foundation. Contact the SAE Foundation at 724-776-4841 if you or your company would like to help support the *A World In Motion* program.

"The A World In Motion programs are excellent physical and life science curriculum supplements for elementary and middle school teachers. At Discovery World Museum in Milwaukee we use AWIM to develop labs that provide an enhancement to physical science learned in the classroom. We also provide teacher training so that they can become familiar with the program and see how it meets standards and their own needs. A World In Motion provides educators with a complete interactive physical science program that meets academic requirements, as well as providing students with an innovative, real-world experience that prepares them for the future. We love the engineering design teams involved with each challenge. By working in groups, students gain real-world experience that is reinforced through the engineer mentor working with each classroom. We've used AWIM for years. We love it, teachers love it, and students respond with enthusiasm throughout their learning process."

Paul Krajniak
Executive Director, Discovery World

A World In Motion has received recognition and endorsements from important organizations that include:

- America's Promise
- Industrial Research Institute
- International Technology Education Association
- National Academy of Science
- National Association of Secondary School Principals
- National Council of Teachers of Mathematics
- National Energy Resources Organization
- National Science Foundation
- National Science Teachers Association

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